

What is claimed is:

1 1. An organic electroluminescent device, comprising:
2 a substrate;
3 a first electrode on the substrate;
4 an organic luminescent layer on the first electrode;
5 a second electrode on the organic luminescent layer,
6 between the first electrode and the second
7 electrode; and
8 a nanostructured organic electroluminescent recovery
9 layer.

1 2. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic
3 electroluminescent recovery layer is on the substrate
4 between the substrate and the first electrode.

1 3. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic
3 electroluminescent recovery layer is on the first electrode
4 between the first electrode and the organic luminescent
5 layer.

1 4. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic
3 electroluminescent recovery layer is on the organic
4 luminescent layer between the organic luminescent layer and
5 the second electrode.

1 5. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic

3 electroluminescent recovery layer is on the second
4 electrode.

1 6. The organic electroluminescent device as claimed
2 in claim 1, wherein the organic luminescent layer comprises
3- a single organic luminescent layer.

1 7. The organic electroluminescent device as claimed
2 in claim 1, wherein the organic luminescent layer comprises
3 stacked organic luminescent layers.

1 8. The organic electroluminescent device as claimed
2 in claim 1, wherein the organic luminescent layer comprises
3 fluorescent luminescent material or phosphorescent
4 luminescent material.

1 9. The organic electroluminescent device as claimed
2 in claim 1, wherein the organic luminescent layer comprises
3 molecular organic luminescent material.

1 10. The organic electroluminescent device as claimed
2 in claim 1, wherein the organic luminescent layer comprises
3 polymer organic luminescent material.

1 11. The organic electroluminescent device as claimed
2 in claim 1, wherein the substrate is transparent or opaque
3 glass or plastic.

1 12. The organic electroluminescent device as claimed
2 in claim 11, wherein the plastic substrate is selected from
3 the group consisting of polyethyleneterephthalate,
4 polyester, polycarbonate, polyimide, Arton, polyacrylate and
5 polystyrene.

1 13. The organic electroluminescent device as claimed
2 in claim 1, wherein the first electrode is transparent,
3 metal, or complex.

1 14. The organic electroluminescent device as claimed
2 in claim 1, wherein the second electrode is transparent,
3 metal, or complex.

1 15. The organic electroluminescent device as claimed
2 in claim 13, wherein the transparent electrode is ITO, IZO,
3 AZO or ZnO.

1 16. The organic electroluminescent device as claimed
2 in claim 14, wherein the transparent electrode is ITO, IZO,
3 AZO or ZnO.

1 17. The organic electroluminescent device as claimed
2 in claim 13, wherein the metal electrode is selected from
3 the group consisting of Li, Mg, Ca, Al, Ag, In, Au, Ni, Pt,
4 and alloys thereof.

1 18. The organic electroluminescent device as claimed
2 in claim 14, wherein the metal electrode is selected from
3 the group consisting of Li, Mg, Ca, Al, Ag, In, Au, Ni, Pt,
4 and alloys thereof.

1 19. The organic electroluminescent device as claimed
2 in claim 13, wherein the complex electrode comprises stacked
3 layer electrodes of Li, Mg, Ca, Al, Ag, In, Au, Ni, Pt, ITO,
4 IZO, AZO or ZnO.

1 20. The organic electroluminescent device as claimed
2 in claim 14, wherein the complex electrode comprises stacked
3 layer electrodes of Li, Mg, Ca, Al, Ag, In, Au, Ni, Pt, ITO,
4 IZO, AZO or ZnO.

1 21. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic
3 electroluminescent recovery layer is a nanostructured thin
4 film layer comprising dielectric material and nanoscale
5 metal particles.

1 22. The organic electroluminescent device as claimed
2 in claim 21, wherein the dielectric material for the
3 nanostructured organic electroluminescent recovery layer is
4 selected from the group consisting of silicides, oxides,
5 carbides, nitrides and combinations thereof.

1 23. The organic electroluminescent device as claimed
2 in claim 21, wherein the dielectric material for the
3 nanostructured organic electroluminescent recovery layer is
4 selected from the group consisting of silicon oxide,
5 aluminum oxide, magnesium oxide, silicon nitride, aluminum
6 nitride and magnesium fluoride.

1 24. The organic electroluminescent device as claimed
2 in claim 21, wherein the nanoscale metal particles is
3 selected from the group consisting of Au, Ag, Al, Ge, Se,
4 Sn, Sb, Te, Ga or combinations thereof.

5 25. The organic electroluminescent device as claimed
6 in claim 21, wherein the dielectric material and the

7 nanoscale metal particles for the nanostructured organic
8 electroluminescent recovery layer are formed at the same
9 time using the same or different methods, and the nanoscale
10 metal particles are doped into the dielectric material.

1 26. The organic electroluminescent device as claimed
2 in claim 1, wherein the nanostructured organic
3 electroluminescent recovery layer is a nanostructured thin
4 film layer comprising organic material and nanoscale metal
5 particles.

1 27. The organic electroluminescent device as claimed
2 in claim 26, wherein the organic material of the
3 nanostructured organic electroluminescent recovery layer
4 comprises molecular or polymer organic material.

1 28. The organic electroluminescent device as claimed
2 in claim 26, wherein the nanoscale metal particles is
3 selected from the group consisting of Au, Ag, Al, Ge, Se,
4 Sn, Sb, Te, Ga and combinations thereof.

1 29. The organic electroluminescent device as claimed
2 in claim 26, wherein the organic material and the nanoscale
3 metal particles for the nanostructured organic
4 electroluminescent recovery layer are formed at the same
5 time using the same or different methods, and the nanoscale
6 metal particles are doped into the organic material.

1 30. An organic electroluminescent device, comprising:
2 a substrate;
3 a first electrode on the substrate;
4 an organic luminescent layer on the first electrode;

5 a second electrode on the organic luminescent layer,
6 between the first electrode and the second
7 electrode;
8 a first nanostructured organic electroluminescent
9 recovery layer; and
10 a second nanostructured organic electroluminescent
11 recovery layer.

1 31. The organic electroluminescent device as claimed
2 in claim 30, wherein the first nanostructured organic
3 electroluminescent recovery layer is on the substrate and
4 between the substrate and the first electrode.

1 32. The organic electroluminescent device as claimed
2 in claim 30, wherein the first nanostructured organic
3 electroluminescent recovery layer is on the first electrode
4 between the first electrode and the organic luminescent
5 layer.

1 33. The organic electroluminescent device as claimed
2 in claim 30, wherein the second nanostructured organic
3 electroluminescent recovery layer is on the organic
4 luminescent layer between the organic luminescent layer and
5 the second electrode.

1 34. The organic electroluminescent device as claimed
2 in claim 30, wherein the second nanostructured organic
3 electroluminescent recovery layer is on the second
4 electrode.